AR5-L

Portable single and three-phase power analyzer

Description

- Measures all of the main electrical parameters of an electricity network
- Measurement in true root mean square
- Built-in energy meter
- With 4 voltage channels and 4 current channels **(AR5-L**)
- Configurable auto-trigger, depending on the parameters required
- Languages: Spanish and English
- Large backlit LCD display
- CAT III 600 V (**EN 61010**). **UL** Certificate
- Display of up to 30 electrical parameters on the screen
- Small size and reduced weight, only 800 g
- Independent files for each measurement
- Including the powerful analysis software: **POWER VISION PLUS**
- Configurable with menus
- Optional operation with no external power supply, with an autonomy of up to 8 hours
- RS-232 Communications with PC
- Clamp auto-detection
- Auto-selection of parameters stored
- Calculation of the time remaining until the memory is full
- Linear or rotating memory (depending on the configuration)

Features

	AR5-L	
Power supply circuit		
Through an external power supply unit	100...240 Vac / 12 Vdc	
Frequency	50...60 Hz	
Consumption	15 V·A	
Operating temperature	0...+40 °C	
Altitude	≤ 2000 m	
Humidity of operation	80 % for temperatures under 31 ºC, with a linear decrease down to 50 % at 40 ºC	
Measurement circuit	Three-phase (3 wires)	Three-phase (3 / 4 wires)
Contamination level	2	
Voltage circuit		
Measurement range	In accordance with the clamp, 0.01 A...20 kA	
Voltage and current transformation ratios	Programmable	
Measurement units	Automatic change of scale	
Internal memory	1 Mb	
Accuracy class (*)		
Voltage	0.5 % ± 2 digits	
Current	0.5 % ± 2 digits	
Active power	1 % ± 2 digits	
Power factor	1 % ± 2 digits	
Build features		
Housing	Reinforced insulation	
Keyboard / Display	On the front panel	
Display	LCD 160 x 160 pixels (backlit)	
Current clamp connector	3	3 / 4
Dimensions	220 x 60 x 130 mm	
Weight	800 g	
RS-232 Outputs	Series output	

AR5-L

Portable single and three-phase power analyzer

Application

- Complete study of the installation where the analyzer is capable of gathering different types of records: harmonics, disturbances, meter verification, transients, flicker, etc.

Features

	AR5-L
Safety	Category III - 600 V, in accordance with 61010
Standards	
EN 61000-3-2 (1995), Harmonics	
EN 61000-3-3 (1995), Voltage fluctuations	
EN 61000-6-4 (2002), Industrial emissions **EN 55011 (1994), Driven (EN 52022 – Class B)** **EN 55011 (1994), Radiated (EN 55022 – Class A)**	
EN 61000-6-2 (2022), Industrial immunity **EN 61000-4-2 (1995), Electrostatic discharge** **ENV 50140 (1993), Radiated electromagnetic field** **EN 61000-4-8 (1995), Rapid transient bursts** **ENV 50141 (1993), RF in common mode** **EN 61000-4-8 (1995), Magnetic field at 50 Hz**	
EN 61000-6-1 (2002), Domestic immunity **EN 61000-4-5 (1995), Shockwave** **EN 61000-4-11 (1994), Power supply interruptions**	
(*) Accuracy is given by the following measurement conditions: Exclusion of errors produced by the clamps and external voltage transformers, with a range of temperature of 5 ... 45 ºC and power factor of 0 ... 1	

References

Analyzer	Clamps	Program	Transport	Type	Code
			Units		
AR5-L	-	Energy / Harmonics	Carrying Bag	**AR5-L- Power analyzer with 4 current inputs**	**M80111**
			AR5-L Kits		
AR5-L	3 x CPR-1000 1 x CPR-500	Energy / Harmonics	Carrying Bag	**3 L AR5-L**	**M80811**
AR5-L	3 x CPR-2000/200 1 x CPR-1000	Energy / Harmonics	Carrying Bag	**4 L AR5-L**	**M80821**
AR5-L	3 x CPR-2000/200 1 x CPR-10003 x CP-5	Energy / Harmonics and Disturbances	Carrying Bag	**5 L AR5-L**	**M80832**
AR5-L	3 x C-FLEX–45 cm 1 x CF-5	Energy / Harmonics and Disturbances	Carrying Bag	**11 L AR5-L-RBT**	**M80843**
AR5-L	3 x C-FLEX-80 cm 1 x CF-5	Energy / Harmonics and Disturbances	Carrying Bag	**12 L AR5-L-RBT**	**M80853**
AR5-L	3 x C-FLEX-45 cm 1 x CF-5	Energy / Harmonics and Disturbances	Case	**11 LM AR5-L-RBT**	**M80643**
AR5-L	3 x C-FLEX-80 cm 1 x CF-5	Energy / Harmonics and Disturbances	Case	**12 LM AR5-L-RBT**	**M80653**
The two analyzers include: 3 voltage cables + power supply					
All kits include: 3 voltage cables + power supply + PowerVision software + energy / harmonics program + 3 clamps					

Accessories
See page M.8-40

AR5-L

Portable single and three-phase power analyzer

Parameters measured

Three-phase system, 4 wires

Parameter	Symbol (unit)	L1	L2	L3	Three-phase value
phase-neutral voltage	V	Yes	Yes	Yes	-
Current	A	Yes	Yes	Yes	Yes
Neutral current (only AR5-L)	I_N	Yes			
Frequency	Hz	Yes	-	-	-
Active power	kW	Yes	Yes	Yes	Yes
Power factor L	kvarL	Yes	Yes	Yes	Yes
Power factor C	kvarC	Yes	Yes	Yes	Yes
Apparent power	kVA	-	-	-	Yes
Power factor	PF	Yes	Yes	Yes	Yes
Active energy	kW·h	Yes	Yes	Yes	Yes
Power factor L	kvar·h L	Yes	Yes	Yes	Yes
Power factor C	kvar·h C	Yes	Yes	Yes	Yes
Voltage harmonics		Yes	Yes	Yes	-
Current harmonics		Yes	Yes	Yes	-
Current harmonics on neutral		Yes			

Three-phase system, 3 wires

Parameter	Symbol (unit)	L1-L2	L2-L3	L3-L1	Three-phase value
phase-phase voltage	V	Yes	Yes	Yes	-
Current	A	Yes	Yes	Yes	Yes
Frequency	Hz	Yes	-	-	-
Active power	kW	Yes	Yes	Yes	Yes
Power factor L	kvarL	Yes	Yes	Yes	Yes
Power factor C	kvarC	Yes	Yes	Yes	Yes
Apparent power	kVA	-	-	-	Yes
Power factor	PF	Yes	Yes	Yes	Yes
Active energy	kW·h	-	-	-	Yes
Power factor L	kvar·h L	-	-	-	Yes
Power factor C	kvar·h C	-	-	-	Yes
Voltage harmonics		Yes	Yes	Yes	-
Current harmonics		Yes	Yes	Yes	-

Two-phase System

Parameter	Symbol (unit)	L1-N	L2-N	Two-phase value L1-L2
phase-phase voltage	V	Yes	Yes	Yes
Current	A	Yes	Yes	Yes
Neutral current (only AR5-L)	I_N	-		
Frequency	Hz	Yes	-	-
Active power	kW	Yes	Yes	Yes
Power factor L	kvarL	Yes	Yes	Yes
Power factor C	kvarC	Yes	Yes	Yes
Apparent power	kVA	-	-	Yes
Power factor	PF	Yes	Yes	Yes
Active energy	kW·h	-	-	Yes
Power factor L	kvar·h L	-	-	Yes
Power factor C	kvar·h C	-	-	Yes
Voltage harmonics		Yes	Yes	-
Current harmonics		Yes	Yes	-
Current harmonics on neutral		Yes		

Single-phase system

Parameter	Symbol (unit)	L1-N
phase-phase voltage	V	Yes
Current	A	Yes
Frequency	Hz	Yes
Active power	kW	Yes
Power factor L	kvarL	Yes
Power factor C	kvarL / (-C)	Yes
Apparent power	kVA	Yes
Power factor	PF	Yes
Active energy	kW·h	Yes
Power factor L	kvar·h L	Yes
Power factor C	kvar·h C	Yes
Voltage harmonics		Yes
Current harmonics		Yes

Programs

AR5-L

Portable single and three-phase power analyzer

Programs

Description	Equipment	Type	Code
Updating harmonics	AR5-L	**Updating ARI**	**M80221**
Flicker (PST and PLT assessment)	AR5-L	**FL Program**	**M80223**
Detection of network disturbances	AR5-L	**PERTURB Program**	**M80224**
CHECK METER, meter verification system	AR5-L	**CM Program**	**M80225**
Optic fibre sensor, shunts and CHECK METER program included	AR5-L	**Optical check meter kit**	**M806B3**
FAST CHECK, motor start-up	AR5-L	**Fast Program**	**M80226**
LEAK METER, detection and analysis of leakages	AR5-L	**Leak Program**	**M80229**
FILE VISION, display of files in AR5-L	AR5-L	**Fil Vision Program**	**M8022A**

Memory capacity example: In the Energy program, if you record 30 network parameters, with a registration period of 15 minutes, you obtain an autonomy of 80 days of memory.

Harmonics

The harmonics program can be used for the following:

- Analysis of all electrical parameters: voltage, current, power, energy, etc.
- Analysis of overheating in transformers, capacitors, etc.
- Detection of neutral current
- Wave shapes shown on the display in real time
- Zoom on a wave shape
- Harmonic decomposition display (30 or 50 harmonics)
- Calculation of the THD % in voltage and current

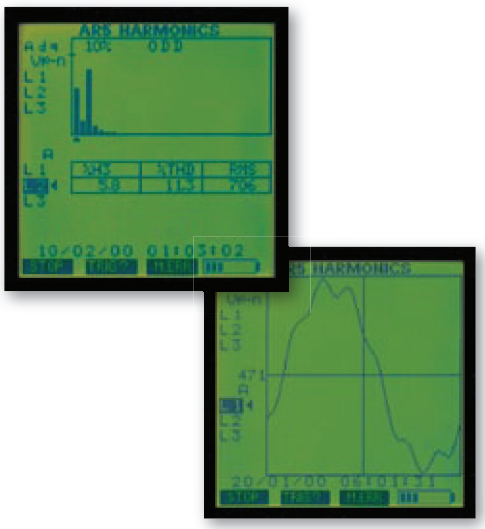
Applications:

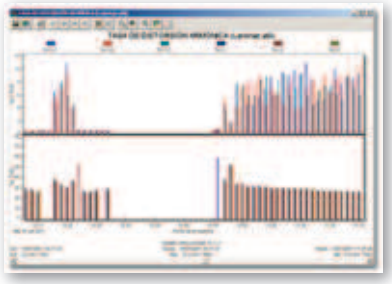
- Calculation of the diameter of cable required to support losses produced by harmonics
- Study of harmonic filtering applications
- Comparison of measurements taken, in accordance with the IEC standard
- Energy and billing study
- Study of installation consumption
- Analysis of the power factor compensation

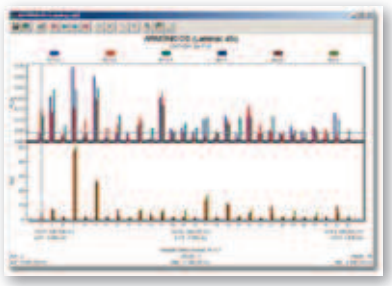
Graphical representation of:

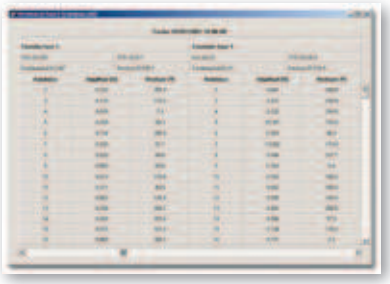
- Wave shapes and harmonic distortion
- Total harmonic distortion THD %
- Harmonic decomposition (up to order 50)
- True root mean square values for voltage and current
- It can be used to prepare tables and lists
- The direction of harmonics can be seen with software

Type	Code
Updating ARI	**M80221**









Programs

AR5-L

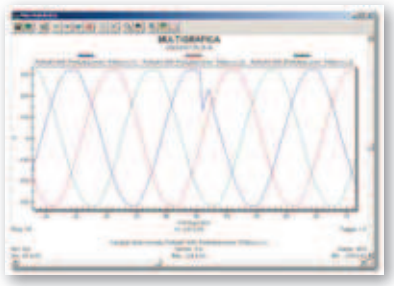
Portable single and three-phase power analyzer

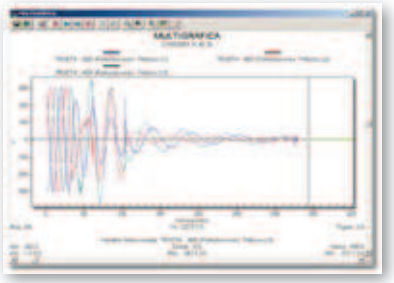
Network quality - Disturbances

Program applications:

- Detection of interruptions, gaps, micro-cuts, peaks, etc.
- Adjustment of the sensitivity for the capture of different types of disturbances
- Information about the number of disturbances detected
- Applications
- Check the effect of switching a load over various points of the installation
- Take "x-rays" of any installation with an **AR5-L** unit and a PC, in order to know everything about a supply network:
  - Evolution of the wave shape
  - Display of an alterationChecking the three phases during the alteration

Type	Code
PERTURB Program	M80224



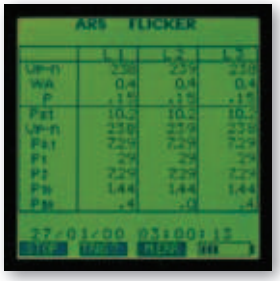


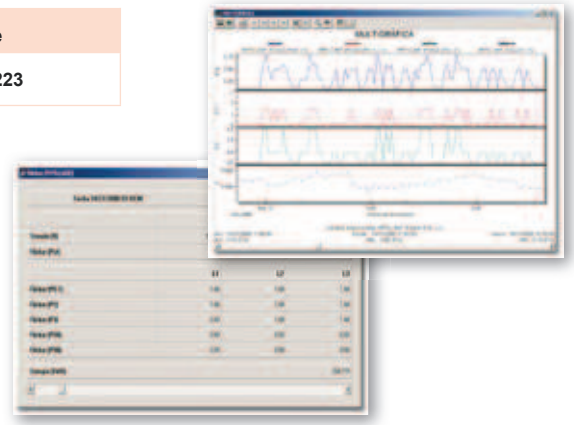
Flicker

The flicker program can be used to:

- Study the flicker present in the installation, whether it is instantaneous, PST or PLT (the latter via software)
- Carry out the same operations executed by the energy program
- Configuration of the times for the calculation of the flicker and energy
- Flicker parameters on a single screen
- Applications
- Determine the level of visual disturbance that can lead to a decrease in the performance of workers
- Study voltage fluctuations

Type	Code
FL Program	M80223



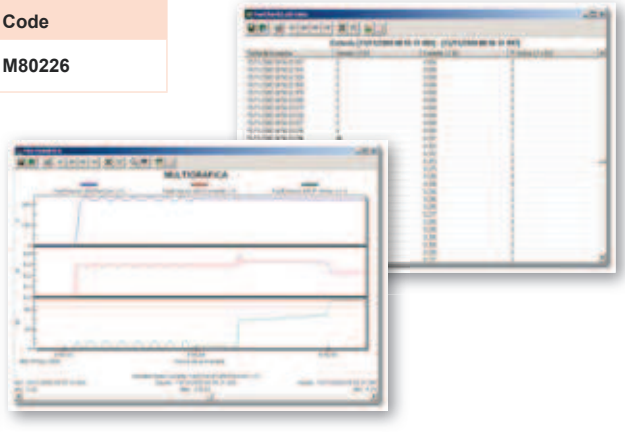


Motor start-up *(Fast check)*

This program can be used to:

- Perform studies on single or three-phase networks to capture the voltage, current, power and power factor during cycle periods
- Capture short voltages (for ex.: motor start-up, welding machines, etc.)
- Potential recording with a *trigger*
- Fixed or rotating memory

Type	Code
Fast Program	M80226



Programs

AR5-L

Portable single and three-phase power analyzer

Check-Meter

The program can be used to:

- Check the measurements of electronic and mechanical meters
- Carry out the tests with no energy cuts
- Carry out 30-second long tests
- Determine the error in active energy or power factor meters
- Programmed setup and percentage error on a single screen
- Up to 4000 records can be created
- Numerical table
- Export to .bmp format or to the clamp-board.

ApplicationsMeter verification studies, creation of detailed reports in each measurement point

- Detection of errors that exceed 1 % (with the **AR5-L**-shunts calibrated set) in electricity meters
- Detect potential fraud situations

Type	Code
CM Program	**M80225**

Optical reader kit

- For electronic meters or meters with verification LED
- Optic fibre cable used to check meters
- Communications and power supply cable connected to **AR5-L**
- Measures impulses with a longitude that exceeds 1 us
- Shock-proof plastic
- Reduced dimensions: 64x41x26 mm

Type	Code
CM optical kit (includes sensor, shunts, program and software)	**M806C3**

Leak

- Measurement of leakage current, up to 10 A, with a transformer
- Measurement with current sensing clamp
- Measurement with earth leakage transformers
- Measurement scales with 2 mA ... 1 A clamp and 20 mA ... 10 A clamp
- Filtering of high frequencies to avoid the effect of switching systems
- Measurement of the true root mean square value during each period (20 ms)
- Continuous measurement with a record of each period of the programmed time
- Programmable record time 1 s ... 100 s
- Detection of the trip moment due to a voltage drop
- Detection of the trip moment, depending on the programmed leakage level

ApplicationsDetection of the trip level of protection relays

- Checking leakages with no need for manual analysis on the site

Type	Code
Leak Meter Program	**M80229**

Programs

AR5-L

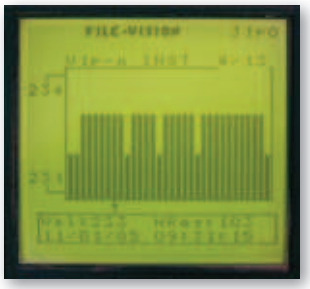
Portable single and three-phase power analyzer

File Vision

- On-site verification of records
- Display of records, with no need for a PC
- The screen has a cursor that indicates the position of the value of the variable selected, in terms of record time and parameter
- Auto-scalable axis of the parameter (adapted to the maximum and minimum values of all records
- Permanent display of 32 records on the screen
- Display of the maximum and minimum value of the records
- You can browse through records easily and quickly
- Variables represented by the different programs:

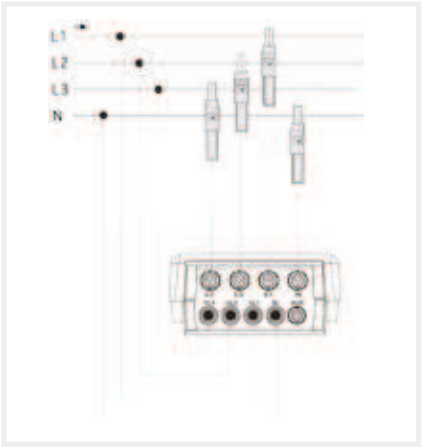
- Harmonics: Vpp, Vpn, A, W, var L, var C, PF, Hz, V·A, I_N, kW·h
- Check-Phase: Vpp, Vpn, A, W, var L, var C, PF, Hz, V·A, I_N, kW·h
- Flicker: Vpp, Vpn, A, W, var L, var C, PF, Hz, V·A, I_N, kW·h, Pst
- Fast-Check: Vpp, Vpn, A, W, var L, var C, PF, Hz, V·A, I_N

Type	Code
File Vision	M8022A

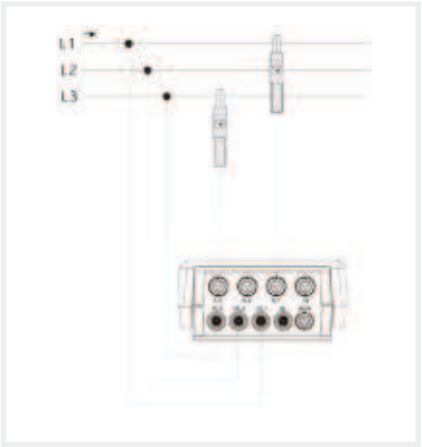


Connections

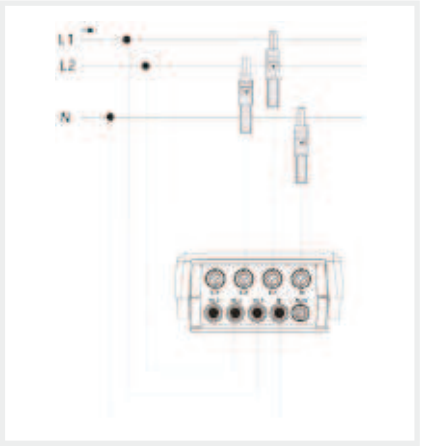
Three-phase system, 4 wires



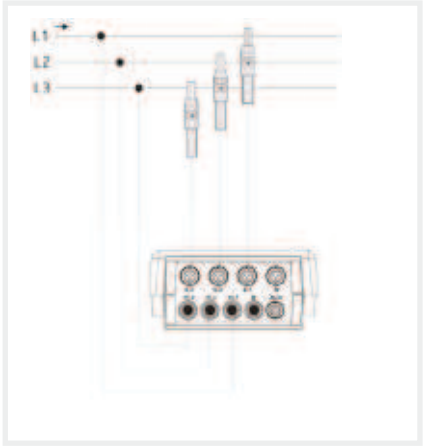
Three-phase system, 3 wires, ARON



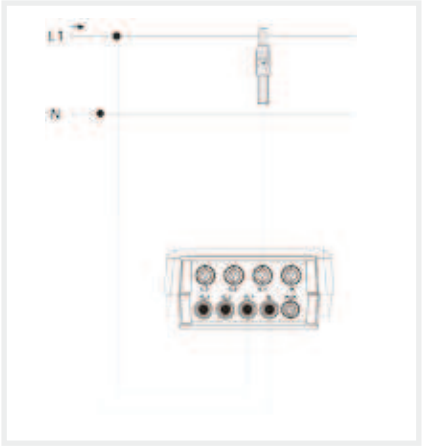
Two-phase System



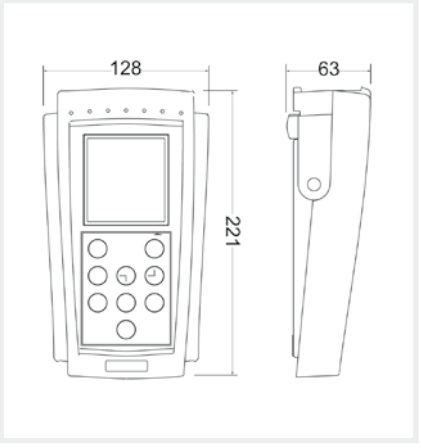
Three-phase system, 3 wires



Single-phase system



Dimensions



Clamps

AR5-L

Portable single and three-phase power analyzer

Clamps	CF-5	CF-10	CP-5	CP-100	CPR-500	CPR-1000	CP-2000/200
Measurement range	1...5 A ac	0.2 mA...10 A ac	0.05..0.5 A ac	1...100 A ac	1...500 A ac	1...1000 A ac	1...200 A ac 10...2000 A ac
Nominal frequency	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz
Output voltage	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac
Dielectric rigidity	5200 V, 50 Hz,1 min	5200 V, 50 Hz,1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min
Scale base error	1 % (up to 0.1 A) 0.5 % (Up to 5 A)	-0,35 %	1 %	0,5 %	0,7 %	0,7 %	Scale 200: 0.5 % (+70 mA) Scale 2000: 0.5% (+100 mA)
Maximum conductor diameter	20 mm	100 mm	20 mm	20 mm	52 mm	52 mm	64 mm
Maximum busbar	1 - 50 x 5 mm or 4 - 30 x 5 mm	5 - 80 x 5 mm or 3 - 80 x 10 mm	20 x 5 mm	20 x 5 mm	1 - 50 x 5 mm or 4 - 30 x 5 mm	1 - 50 x 5 mm or 4 - 30 x 5 mm	5 - 125 x 5 mm or 3 - 100 x 10 mm
Description / Code	**CF-5** **Code M81331**	**CF-10** **Code M81334**	**3 CP-5 Kit** **Code M81041**	**3 CP-100 Kit Code M81042** **1 CP-100Neutral clamp (blue) Code M81036**	**3 CPR500 Kit Code M81043** **1 CPR-500Neutral clamp (blue) Code M81037**	**3 CPR-1000 Kit Code M81044** **1 CPR-1000 - Neutral clamp (blue)Code M81038**	**3 CP-2000/200 Kit Code M81045**

Clamps

AR5-L

Portable single and three-phase power analyzer

Clamps C-FLEX 20 000 / 2 000 / 200 A-45

Longitude sensor	45 cm
Scales	200 A / 2000 A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / A Scale 20k or 10k: 0,1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation **IEC 1010** - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10 ... +55 °C
Humidity	90 % HR (a 50 °C)

Scales	Type kit	Code
20 kA / 2000 A / 200 A	**Kit 3 C-FLEX 20000/2000/200 A-45**	**M81141**

Clamps C-FLEX 20 000 / 2 000 / 200 A-80

Longitude sensor	80 cm
Scales	200 A / 2000 A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / A Scale 20k or 10k: 0,1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation **IEC 1010** - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10 ... +55 °C
Humidity	90 % HR (a 50 °C)

Scales	Type kit	Code
20 kA / 2000 A / 200 A	**Kit 3 C-FLEX 20000/2000/200 A-80**	**M81142**

Clamps C-FLEX 20 000 / 2 000 / 200 A-120

Longitude sensor	120 cm
Scales	200 A / 2000 A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / A Scale 20k or 10k: 0,1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation **IEC 1010** - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10 ... +55 °C
Humidity	90 % HR (a 50 °C)

Scales	Type kit	Code
20 kA / 2000 A / 200 A	**Kit 3 C-FLEX 20000/2000/200 A-120**	**M81143**

AR5-L accessories

Charging power supply and interface (RS-232)

Description

Includes:
- 80 - 250 V ac Power supply
- Power supply cable
- Cable to connect the power supply and the **AR5-L**
- Series cable (RS-232) to connect the power supply and PC

Code M89926

AR5-L battery

Description

Replacement for the internal battery of the **AR5-L** analyzer

Code M89904

Case for AR5 / AR5-L

Description

Cover for the **AR5-L** analyzer, so that it can be transported easily and comfortably

Code M89901

Carrying bag for AR5 / AR5-L

Description

Includes pockets for the following:
- One **AR5-L** analyzer
- 4 current sensing clamps (**CP5**, **CP100**, **CPR500**, **CPR1000**, **CP2000/200**, **CF-5** or any kit with flexible clamps)
- Power supply and power supply / voltage measurement cables
- Folder with the manuals of PowerVision and other programs
- Accessories of the **AR5-L** analyzer

Code M89905

AR5-L accessories

Case for AR5-L clamps

Description

Case for **AR5-L** clamps

Code M89921

1000 L Case

(with protective foam, for CPR-1000 clamps of the AR5-L analyzer)

Description

Includes pockets for the following:

- One **AR5-L** analyzer
- 4 **CPR100** current sensing clampsPower supply and power supply / voltage measurement cables

Code M89923

2000 L Case

(with protective foam, for CPR-2000/200 clamps of the AR5-L analyzer)

Description

Includes pockets for the following:

- One **AR5-L** analyzer
- 4 **CPR2000** / **200** current sensing clamps
- Power supply and power supply / voltage measurement cables

Code M89924

C-FLEX Case

(with protective foam, for C-FLEX clamps of the AR5-L analyzer)

Code M8992F

AR5-L accessories

CheckMeter + optical reader

Description

Includes:

- CheckMeter Program for **AR5-L** (last version). The corresponding cartridges are included, such as the CheckMeter program for **AR5-L** and the co-processor.
- **CheckMeter** optical sensor (with the optic fibre cable to monitor meters and the communications and power supply cable that connects it to the **AR5-L**)
- Program User Manual CheckMeter (including the explanation of how the sensor must be used)

Code M806C3

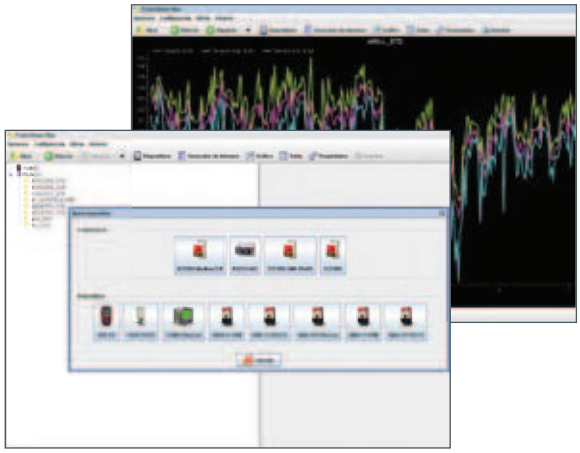
Power Vision Plus

Description

- Software for the remote management and measurement of the information recorded by the **AR5-L** portable analyzers and other units manufactured by **CIRCUTOR**.
- It is a high-performance tool that increases the power of the information recorded by the units.

For more information, see M.9 Catalogue

Code M90411



PC Communications cable

Description

- RS-232 Series connection cable, with two DB9 connectors (male and female), with a length of 1.2 m. Used in **AR5** and **AR5-L** analyzers to download the data stored in the PC with the Power Vision Software.

Code M8991E

AR5-L accessories

Adaptor cable (3 cables) AR5-L

Description

- Set of three cables, with a 4-way female connector with colour phase on one end and a 3-pin male connector on the other end.

Code M89917

Adaptor cable (1 cable) AR5-L

Description

- 4-way female connector on one end and 3-pin male connector on the other end.

Code M89922

Adaptor cable (1 cable) AR5

Description

- 3-way female connector on one end and 4-pin male connector on the other end, with phase colour.

Code M89932

Cable to connect the AR5-L unit to the power supply

Description

- Cable to connect the power supply input and communications between the analyzer and power supply.

Code M8992C

AR5-L accessories

Set of 4 voltage cables

Description

- Set of 4 cables to connect the voltage inputs of the **AR5-L** analyzer to an electric panel or sub-panel.

Code M89908

Crocodile clamp (1 unit)

Description

- Clamp that adapts to the voltage cable and can be connected to an electric panel or sub-panel to measure voltage.

Code M89909

C-80 accessories

3 voltage cable replacement kit

Description

- Set of 3 cables to connect the voltage inputs of the **C-80** analyzer to an electric panel or sub-panel.

Code M89907

C-80 Case

Description

- Case to carry the **C-80** analyzer easily and safely.

Code M89931